

Navy Purchase Description Marine Gas Oil Fuel Concerns

- DESC Quality Day Briefing -

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MGO Overview

- Navy Distillate Fuel (MILSPEC F-76) no longer readily available to CG
 - Very strict spec, testing & handling requirements
 - Lots of positive Navy & CG experience using F-76
 - Compatible with both diesels and gas turbines
- Navy Purchase Description MGO commercially available alternative fuel
 - Procured under DESC contract
 - Fewer and less restrictive requirements than F-76

Coast Guard Fuel Policy

- NPD MGO considered an alternate fuel on diesel powered cutters
 - Must be used within 6 weeks due to lack of storage stability requirements
 - Serious operational constraint, not really practical
 - Consistent with Navy NPD MGO policy
- Not used on gas turbine powered cutters
 - Technical concerns with CG's FT4 gas turbines
 - Treated as an emergency fuel
 - Only minimum amounts lifted if nothing else available

CG Realities

- CG using high percentages of NPD MGO fuel
 - Due to distributed CG basing must rely on commercial suppliers
 - Our only source of F-76 is Navy bases and oilers
- CG crews avoid lifting NPD MGO
 - Primary concern is storage stability
 - Destabilized fuel linked to several engine casualties
- Coordinated effort between CG ELC, DESC, and NSWC/CD, & NRL
 - Define impact of burning NPD MGO and mitigate any possible consequences

F-76 Vs. NPD MGO

- Most parameters nearly identical
- No requirements in MGO for:
 - storage stability
 - maximum particulates (mg/l)
 - demulsification time
 - trace metals
- Less restrictive requirements in NPD MGO for:
 - acidity
 - carbon residue
 - ash content

Priorities

- Storage stability
 - Must expand current 6 week storage limit
- Resolve FT4 GT concerns
 - Current ban results in serious operational restrictions for High Endurance Cutters
- Define operational/maintenance actions required to mitigate MGO concerns
 - Expanded to look at all CG fuel handling policies
 - Will define both physical SHIPALTs and operational/husbandry policy changes
 - Based on best information available to date

Storage Stability

- No storage stability testing requirements in NPD
 - High change out rates for engine filters
 - Centrifugal purifiers ineffective
 - Disarms coalescers
 - Expensive to pump off and dispose of
- Biological contamination also a major issue
 - Most CG “destabilized” fuel problems appear to be microbiological in nature
- Need standardized procedures for bad fuel

FT4 Gas Turbine Concerns

- Hot Section Corrosion
 - No limits on trace metals
 - Trace metals should not be present in a 100% distillate fuel
 - As delivered condition what is important
 - Higher Carbon Residue & Ash levels
- Burner Can issues due to higher Carbon Residue & higher viscosity
 - Burner can streaking/distress
 - Nozzle clogging & coking
 - FT4 design more susceptible than LM2500

The Plan

- Plug into existing fuel expertise
 - Defense Energy Supply Center (DESC)
 - Naval Surface Warfare Center/Carderock Division (NSWC/CD)
 - Naval Research Laboratory (NRL)
- Benefit from their past work & experience
 - Avoid previously visited non-productive paths
- Cooperate in any ongoing efforts
- Leverage CG work to greatest extent possible

Fuel Sampling

- Participating in DESC sampling program
- Build database of fuel characteristics
 - as received by CG vessels
 - non F-76 & non JP-5 fuel samples
- 15 cutters participating in pilot program
 - geographically distributed along both coasts
 - includes ships that routinely lift fuel outside CONUS
- Want to define how bad (or good) situation really is

Fuel Analysis

- Special DESC sampling/analysis contract
 - Mod to existing Navy DNV sampling contract
 - Testing to NPD requirements plus:
 - Chemical storage stability
 - Particulates
 - Acidity
 - Trace metal content
 - Hope to define a more realistic time limit for usage (>> 6 weeks) and typical trace metal/ash content to address FT4 corrosion concerns

FT4 Issues

- FT4 material laboratory burner rig testing
 - Investigate Hot Section Corrosion Concerns
 - Initially examines only impact of higher Carbon Residue levels
 - Follow-up testing for “typical” trace metal content
- Planned shipboard test
 - Address both hot section and burner can concerns
 - Baseline & periodic engine inspections
 - “Controlled” test with 1 year duration
 - No special test fuel & no special mission profile
 - Instrument all critical parameters
 - Sample & analyze fuel

Update CG Fuel Policy

- Conduct review of CG fuel system characteristics/capabilities
 - Establish baseline for where we are
 - Identify where procedural or physical changes must be made
- Standardized procedures for problem fuel
 - Define testing to determine cause
 - Recovery/prevention actions
- Not limited to only NPD MGO
 - Includes review of biocide additive use

Planned FY 99 Efforts

- Kickoff & expand fuel sampling/analysis program
- Identification of SHIPALTS/management practices required to mitigate use of MGO
- Completion of FT4 laboratory corrosion tests
- Initiate WHEC 378 shipboard MGO evaluation
- Continued support from Navy fuel expert community
 - Expand to include biological contamination expertise

Funding Problems

- Funding problems may limit FY99 progress
 - Currently approved funding will limit efforts to updating CG fuel policy
 - Shipboard fuel sampling/analysis potentially limited to FY 98 funding
 - less than full year's data
- Attempting to increase funding
 - Hope to at least complete lab FT4 burner rig testing & add funding to shipboard analysis effort
 - Would also like to complete detailed test plan for shipboard FT4 testing

Summary

- MGO fuel issue a complex problem
 - No magic bullets
- Making progress
 - Still got a way to go before all concerns are adequately addressed
 - Follow-on effort required into FY 00
 - Funding shortfall is a major hindrance